Changes in the Road Transport Sector: Drivers, Constraints, Decision-Making Processes

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Abstract. The transport sector worldwide is experiencing transformative changes due to new technological possibilities, demographic changes and environmental pressures. This entails also strategic and organisational changes in national and regional transport administrations. Embedded in public governance systems, these are also affected by the increasing political focus on sustainability. This paper presents the most influential pressures on the transport sector and the responses of transport administrations. It also discusses the processes and structures of organisational sensemaking through which the external drivers get translated into specific strategies, thus shedding light on the political and organisational constraints of change and change management.

Keywords: transport, public administration, organisational sensemaking, change management

1 Introduction: the road transport sector

Over the last years, the transport sector has been undergoing far-reaching changes on a global level. These are caused mostly due to factors such as new technological possibilities (such as connected and autonomous vehicles, CAVs – 'driverless cars', digitalisation and ubiquity of transport information), demographic changes and changes in customer demand, or risks to the infrastructure resulting from increasing natural hazards. Public administration organisations and public enterprises responsible for transport – particularly road transport – struggle with the increase of transport volume, congestion and strain on system capacities both in passenger and freight transport, as well as catching up with fast developing land use and urbanisation patterns. And, somewhat surprisingly, even though across the OECD countries the factors and pressures to change seem quite uniform, the response of national and regional transport agencies is far from that. What we see is a variety of strategies adopted and changes undergone.

Our ongoing research project, titled "Evaluating the transformations in transport administrations", conducted in co-operation with the World Road Association (PIARC)

and funded by the ASFINAG Bau Management GmbH[1], focuses on analysing change processes, as well as their underlying drivers, in public transport agencies worldwide. The present paper, with focus on environmental sustainability, attempts to achieve a deeper understanding of the driving forces of individual changes in the transport sector, as well as the varied ways through which these drivers get 'translated' in the organisation – and this in an environment saturated with political pressures and interests – into specific strategies. Identifying and analysing the multitude of driving forces in the transport sector should enhance the understanding of the challenges lying ahead and contextualise the urgent need of innovation in the respective areas. Through these findings, we hope to contribute to the ongoing interdisciplinary discussions and developments in engineering and technology by shedding light on the organisational and political framework in which the future of mobility is negotiated.

2   Research approach

2.1   Conceptual framework: external drivers and organisational sensemaking

Our conceptual framework consists of four causally interlinked 'logic stages' that, in a processual manner, describe change in an organisation as well as attempts at change management (see Fig. 1). The sequence of these stages should not be seen as a purely linear process; there are numerous interlinkages and feedback loops between these stages. In the following we will focus on the first two stages.
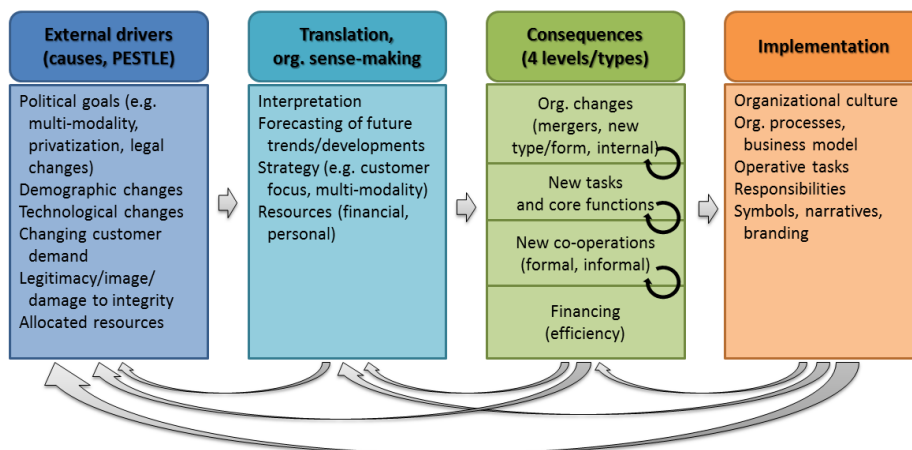

Fig. 1. Conceptual structure guiding the research design.

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[1] The ASFINAG Bau Management GmbH belongs to the Austrian state-owned ASFINAG group (Autobahnen- und Schnellstraßen-Finanzierungs-Aktiengesellschaft, Highway and Motorway Financing and Share Company), and is responsible in particular for the maintenance of state road infrastructure.

The first stage describes the external/environmental factors transport administration organisations are facing. By drivers we understand events and processes occurring in the external environment of the organisation which *could* exert influence on the organisation and its performance – as opposed to "[f]orces and variables outside the organisation that influence or will shortly influence organisational performance" (Burke 2008, p. 191). In the context of the transport sector we identified the following seven driver categories: (1) changes in customer demand, (2) technological trends, (3) changes in the political agenda, (4) changes in the regulatory framework, (5) changes in the economics of transport infrastructure, as well as (6) changing pressures of the natural environment, and (7) demographic and spatial developments.[2] The questionnaire sent to PIARC members worldwide further included a temporal dimension: it differentiated between external drivers having had an influence on the organisations within the last 10 years, and drivers expected to exert influence in the near future.[3]

The second stage 'translates' or mediates between the influence of an external driver and its organisational impact and consequences. External drivers do not exert their influence on organisations purely 'objectively' (in a mechanistic fashion), but need to be 'sensed' and 'made sense of', before they can be translated into action (i.e. into the design of a strategy and putting it in motion). The scope of action of an organisation in response to the drivers therefore may vary significantly and is difficult to predict without further knowledge of the organisation's sensemaking processes and its political embeddedness.

We understand these translation processes through the lens of organisational sensemaking (Weick 1995, cf. Feldman 1989, Czarniawska-Joerges 1992). It includes activities such as 'sensing' of external drivers, their interpretation (i.e. what they mean for the organisation, what risks and opportunities they offer), forecasting of future trends/developments, strategy making (i.e. deciding on different directions and priorities such as customer orientation or multi-modality), consultations and 'puzzling together', as well as allocating personnel and financial resources for these activities. According to Weick (1995, p. 76ff.), sensemaking (also at the level of individuals) covers several important aspects: it is (i) grounded in identity construction; (ii) retrospective;

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[2] This taxonomy of external factors is also largely compatible with the well-known PESTLE approach, which takes into account Political, Economic, Social, Technological, Legal and Environmental factors.

[3] Past drivers are likely to be reported with higher measure of accuracy, both in terms of factual verity (especially when a larger number of data sources, including published scientific studies and media reports, were available to the organisation), as well as intersubjective, symbolical validity. Reported future drivers will more likely be views of single individuals rather than results of organisational sensemaking (i.e. subjective rather than intersubjective truths). Also note that these might come about (or be avoided) exactly because they were expected, and appropriate steps were taken, regardless of their "objective", factual importance (what Merton, 1948, described as self-fulfilling – or self-defeating – prophecy).

(iii) enactive of sensible environments; (iv) social; (v) ongoing; (vi) focused on and by extracted cues; (vii) driven by plausibility rather than accuracy.

2.2 Method: questionnaire survey

In 2017 we conducted a questionnaire survey of the PIARC member organisations (currently being followed by a case study research). Out of the 42 transport organisations we sent the questionnaires to, 21 participated in the survey (see also Fig. 2). Two thirds of the participating organisations are located in the EU, and around 25 per cent of the organisations are operating in other OECD countries. The rest, roughly 10 per cent of the responding organisations, are affiliated neither with the EU, nor with the OECD. Two-thirds of the organisations were operating on a national level, while in a third of the cases the transport administration's activities were limited to the regional level.
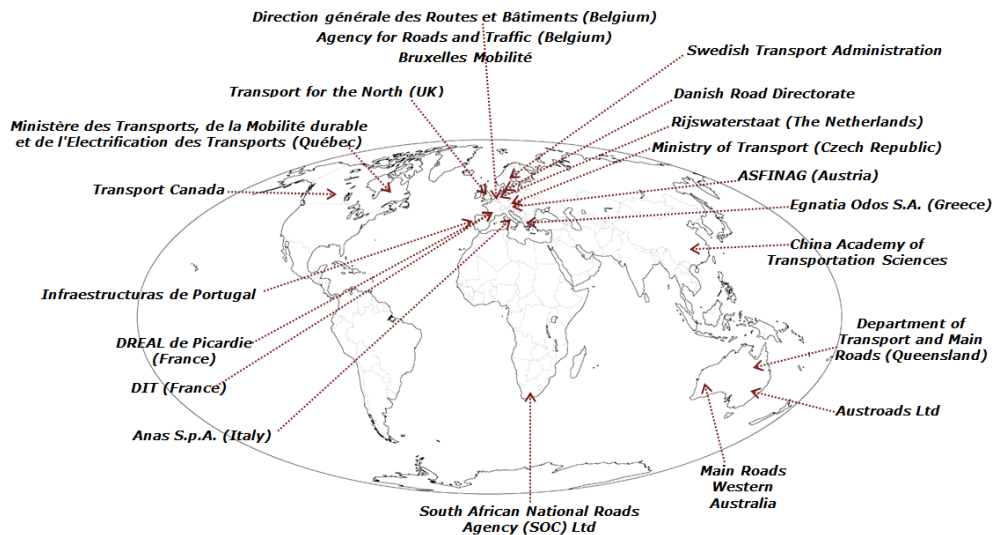

Fig. 2. Organisations participating in the survey.

The organisations' primary responsibilities typically include project planning, construction and implementation of infrastructure and services, as well as maintenance. Further, strategic policy and planning, operation and management, oversight and funding/financing also belong to the organisations' main responsibilities.

3 Results

3.1 The political context

Public organisations catering to transport infrastructure are strongly embedded into systems of public governance, which place specific constraints on decisions taken by these organisations. When measuring political influence, political decisions, approvals and other similar political influences are regarded as relevant to all organisations. Over 80 per cent even consider the political influence as crucially important, especially in the form of legal regulations, influence on funding/budget size, as well as new priorities set by the government. An additional challenge lies in the involvement of stakeholders. In 75 per cent of the analysed changes elected politicians or senior civil servants from regional governments, permit-issuing ministries (e.g. ministry of transport), financial authorities setting budgetary guidelines and parliaments appointing legal guidelines were participating.

Particularly pertinent to the topic of the conference panel are political priorities and regulations concerning environmental sustainability. In 2015, transport-related emissions made up 18 per cent of all manmade CO_2 emissions and the absolute numbers are growing (OECD/ITF 2017, p. 20). In the course of the last two years, international agreements shaped the political agenda within the transport sector. As a response to global climate change, the Paris Agreement has served as an impulse for policy makers in the transport sector to develop strategies towards increased electrification, innovative infrastructural solutions, electrified mobility systems and carbon neutrality (ibid.). The Agenda for Sustainable Development adopted by the United Nations General Assembly in 2016 targets the transport sector's profound transformation by focusing on enhanced sustainability, "clean energy", road safety, resilient infrastructure and affordable access to the transportation system (ibid., p. 20f.). The challenges to meet ambitious political goals while simultaneously catering to – as response to the economic environment – an ever increasing demand for transport, both in passenger and freight, pose a demanding task for industry, science and politics alike. Due to the close interrelationship between transport sector and public governance systems, it is necessary to include this political context and new priorities (such as an enhanced focus on multimodality and sustainability), and perhaps even the broader socio-political discourses, in the analysis of changes in the transport sector.

3.2 External drivers: importance of environmental sustainability

Our results show that transport administrations were experiencing complex changes with a multitude of influencing and interrelating factors, both internal and external. With regard to relevant drivers within the last 10 years, the majority of influential drivers were related to changes in the natural environment (including climate change in particular) and the resulting political, regulatory and customer reactions to these changes. The second prevailing topic is technological change, which also tends to translate into changes in the political agenda. Drivers such as risks to infrastructure due to

climate change (in 83 per cent of the cases), changes in customer demand (86 per cent) or technological developments (90 per cent) were among the most frequently cited reasons for change. At the same time, the priorities in the political agenda shifted towards integration between transport modes (62 per cent), environmental goals (86 per cent), and cost reduction (71 per cent).

In the coming years, all the drivers which are anticipated to be influential within the transport sector are either related to new technological possibilities, or environmental sustainability. This aspect stresses the importance of innovative research for new solutions in the field of technology and sustainability to meet future demands and challenges. With equally high frequency (95 per cent), the customers' preference for environmentally friendly modes of transport, technological possibilities and public support for intelligent transportation systems and for connected and autonomous vehicles are among the most notable expectations within the transport sector. These were followed by the prediction of new environmental regulations (89 per cent), and, with equally high frequencies (86 per cent), technological possibilities and public support for linking different modes of transport (multimodality) and, as political priorities, technological change and environmental sustainability and combating climate change.

Changing pressures of the natural environment are perceived differently in relation to the organisations' geographical situatedness. For organisations located in Central and Northern Europe, pressures of the natural environment have not exerted influence so far and are expected to exert only moderate influence in the future, whereas in Southern Europe, Australia, Canada and China the pressures of the natural environment have exerted and are expected to exert influence.[4]

3.3   Changes undertaken

Usually, the organisational and strategic changes that occurred in transport administrations within the last 10 years had multiple drivers and were linked to multiple internal objectives. Our data describes three types of changes within transport administrations:

(i)   Organisational mergers or significant internal restructuring. These happen in reaction to, e.g., changes in multi-level governance, need for synergy and removal of gaps and overlaps, or the motivation to improve efficiency. Examples: Swedish Transport Administration (Trafikverket), Danish Road Directorate.

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[4] Research indicates that climate change-induced shifts in transport patterns (especially in areas of tourism and agriculture) will likely affect also Northern European countries (Koetse/Rietveld 2009). The picture regarding the threat to road and rail infrastructure and air transport disruption is somewhat uneven (with regional variations), with higher risk borne by coastal areas (ibid.; cf. Regmi/Hanaoka 2011). Developing countries, due to their geographic locations and higher shares of unpaved roads and less dense road networks, will face higher economic burden resulting from climate change than developed countries (Chinowsky et al. 2010).

(ii)   Changes towards the improvement of the organisation's public image, typically resulting in increased customer orientation (possibly accompanied by a radical, i.e. transformational, redefinition of values and purpose). Examples: Main Roads Western Australia, Direction Régionale de Picardie.

(iii)   And – in 20 per cent of the changes – the redefinition of the organisation's business model and purpose. Currently experienced drivers (often of an economic nature such as budget cuts or deficit reduction) or adaptation to future, expected drivers lead to rethinking of the business model, resulting in a focus on multimodality and environmental sustainability with a concomitant shift in values, attitudes and beliefs. Sustainable development perspectives and/or sustainable mobility policies were either included into newly developed strategies (as "sustainability mainstreaming"), or were included as tasks for newly created organisational structures. Examples: Québec's Ministère des Transports, France's Ministère de la Transition Écologique et Solidaire.

3.4   The mediating link: organisational sensemaking – structures and processes

Although "[t]he criticality of an organisation's external environment … cannot be over-stated" (Burke 2008, p. 186), especially if the change is planned or at least directed in some manner, the drivers will be 'translated' through a process of organisational sense-making. We focus on the 'sensing' of external drivers and their subsequent collective interpretation, resulting into the melding of multiple voices and realities into one 'actionable', persuasive account and strategy capable of mediating a transformational change in the organisation. Objective external factors can fail to get registered within the organisation, get interpreted as some other phenomenon, or only appear on the organisation's radar way too late. As an example, environmental factors (such as scarcities of environmental resources or natural hazards) might appear to the organisation – i.e. become translated as – rising fuel or infrastructure insurance costs, and thus as economic drivers.

Common, and with only minor deviations across organisations, seems to be a close interaction between the top management level and the strategic branch as well as specially initiated working groups dedicated to future challenges. The strategic branch usually develops and recommends strategies to the corporate executive board, which ultimately decides on the strategies to be implemented.[5] In several cases, in order to enhance the organisations' preparedness, special working groups are assigned with the task to identify future trends. Further, working groups can take on the responsibility of ongoing environmental scanning, as well as analysing demographic developments within the organisation's area of activity. Depending on the topics, representatives of the organisations' employees are also consulted within these working groups. Additionally, external consultants are frequently hired to either conduct independent studies

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[5] Note that the type of the organisation did not prove to have an influence on the drivers seen as influential, or on the ways the organisations reacted to future trends.

and/or provide information to the organisation's strategic branch and working groups. In most of the organisations (89 per cent) multiple alternative strategies or priorities have been voiced in the strategic branch and working groups as advisory boards. It would seem that rather than a single preferred solution and the TINA approach ("there is no alternative"), multiple voices in the organisations and several courses of actions have been considered.

4   Conclusion

Among the influential drivers within the transport sectors, we could identify a strong focus on sustainability, manifested through an increasing customer demand for environmentally friendly transport solutions, a shift in political priorities focusing on sustainability mainstreaming and adaptation to climate change, also expressed through new environmental regulations. Although the environmental aspects are exerting its influence on transport administrations almost uniformly, we could give an overview[6] over the mechanism of how the subsequently developed strategies and implemented changes differ due to varying sensemaking processes within the organisations.

The increasing focus on sustainability does not come as a surprise. It is an expression of a broader societal debate and resulting political goals at national and international level. Thus, howsoever the sensemaking process within the organisations takes shape, it is subject to the surrounding public governance system. This aspect is a distinguishing feature for public administrations – orientated primarily on ensuring societal wellbeing and generating public value – to which the analysed transport organisations pertain. It is this distinct aspect that constitutes a characteristic distinction between general and public management. To enhance the understanding of how drivers within the transport sector are perceived and translated by transport administrations, it is thus indispensable to take into account contemporary discourses and the organisations' political context, which we currently investigate by means of our ongoing in-depth case study analysis. We anticipate our research to contribute to the debates on the complexities and underlying interdependencies of change management in public administrations.

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[6] Owing to the format, this present short paper is sparse on specific examples; in our argumentation we rather focused on the overall frame than individual changes.

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